Northern Virginia Electric Cooperative

Electric Distribution System Automation Program

Abstract

Northern Virginia Electric Cooperative's (NOVEC) Electric Distribution System Automation Program project is deploying digital devices to expand automation and control systems to cover a majority of NOVEC's substations and distribution circuits. The project also deploys a new communications network to compliment the distribution system upgrades, providing more precise monitoring of grid operations. The project aims to improve system efficiencies, reduce line losses, and enhance situational awareness of the system and critical components to improve reliability and lower operating costs.

At-A-Glance

Recipient: Northern Virginia Electric Cooperative

State: Virginia

NERC Region: SERC Reliability Corporation

Total Budget: $10,000,000

Federal Share: $5,000,000

Project Type: Electric Distribution Systems

Equipment

- **Distribution System Automation/Upgrade for 135 of 235 Circuits**
  - **Remote Service Switches**
  - **Automated Capacitors**
  - **Automated Voltage Regulators**
- **Substation Automation/Upgrade for 29 of 53 Substations**
  - **Communications Equipment/SCADA**
  - **Smart Relays**

Key Targeted Benefits

- **Increased Electric Service Reliability and Power Quality**
- **Reduced Cost from Distribution Line Losses**
- **Reduced Operations and Maintenance Costs**
- **Deferred Generation Capacity Investments**
- **Reduced Greenhouse Gas and Criteria Pollutant Emissions**
- **Reduced Truck Fleet Fuel Usage**

Smart Grid Features

Communications infrastructure includes internet protocol-based communications links from the substations to the main data center. NOVEC expects these platforms to more precisely observe, manage, and report on distribution system operations and power flows and enable remote controls in response to changing grid conditions. NOVEC leverages the upgraded communications infrastructure to integrate supervisory control and data acquisition (SCADA) system and outage management software with new distribution and substation automation equipment. SCADA and other data are transported from field locations to central servers via a secure private network.

Distribution automation systems include advanced automated equipment to improve the performance of the distribution equipment. NOVEC is deploying capacitor banks, regulators, and reclosers on 135 high-priority circuits. This reduces service interruptions and the frequency and duration of outages while also reducing field operation requirements.

Distribution system energy efficiency improvements involve the integration of automated capacitors and voltage regulator with a power quality monitoring system. The capacitors improve voltage and volt ampere reactive (VAR) control, power quality, and distribution capacity by reducing energy losses on the distribution system.

Substation automation systems include modern digital control equipment to better monitor substation assets while helping to improve system reliability. Systems include voltage reduction controls for more effective demand response programs, and provide capabilities for monitoring and control of demand on the distribution system during peak load periods.

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Timeline

Key Milestones	Target Dates
Substation automation installation starts	Q3 2010
Distribution automation installation starts	Q4 2010
Substation automation installation complete	Q4 2012
Distribution automation installation completes	Q4 2012

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